

Unit 7

Day 3

General and Mixture Problems

Interest = Principle · rate · time

$$I = P \cdot R \cdot T$$

P = principal

R = rate

T = time

- 1) Anne Kelly received \$52,000 profit from the sale of some land. She invested part at 7.5% interest and the rest at 5.5% interest. She earned a total of \$3280 interest during the 1st year. How much did she invest at each rate?

$$\begin{array}{ccccccc} \text{let } & x = & \text{amt inv. at } & 7.5\%(\$) \\ 31,000 = & 52,000 - x = & \text{''} & \text{''} & \text{''} & 5.5\%(\$) \end{array}$$

$$\begin{array}{lcl} \text{Amt earned} & + & \text{Amt earned} \\ \text{at } 5.5\% & & \text{at } 7.5\% & = & \text{Total} \\ & & & & \text{earned} \\ .055(52,000 - x) + .075x & = & 3280 \\ & & x = 21,000 \end{array}$$

$$(16) \left(\frac{1}{\cancel{R}} = \frac{1}{r_1} + \frac{1}{r_2} \right)^{R, r_1, r_2}$$

$$r_1 r_2 = \cancel{R} r_2 + \cancel{R} r_1$$

$$r_1 r_2 = R(r_2 + r_1)$$

$$R = \frac{r_1 r_2}{r_2 + r_1}$$

$$\frac{1}{R} = \frac{1}{r_1 r_2} + \frac{1}{r_2 r_1}$$

$$\frac{1}{R} = \frac{r_2}{r_1 r_2} + \frac{r_1}{r_2 r_1}$$

$$\frac{1}{R} = \frac{r_2 + r_1}{r_1 r_2}$$

$$R = \frac{r_1 r_2}{r_2 + r_1}$$

$$(14) \quad A = P \left(1 + \frac{i}{m} \right)$$

$$\frac{A}{P} = 1 + \frac{i}{m}$$

$$\frac{\frac{A}{P} - 1}{\frac{A}{P} - 1} = \frac{\frac{i}{m}}{\frac{i}{m}}$$

$$\frac{A - P}{P} = \frac{i}{m} \quad m = \frac{iP}{A - P}$$

Mixture Problems

- 1) A pharmacist wishes to strengthen a mixture that is 10% alcohol to one that is 30% alcohol. How much pure alcohol should be added to 7 liters of the 10% mixture?

	Volume of mixture (L)	% alcohol	Volume of Alcohol (L)
Start	7	.1	.7
Add	X	1	X
Finish	7+X	.3	.7+X

let X = amt of pure alc. added (L) = 2

finished vol. alc = finished vol. alc.

$$.7 + X = .3(7 + X)$$

$$7 + 10X = 3(7 + X)$$

$$X = 2$$

- 3) For a chemistry class, the instructor needs a 20% solution of potassium permanganate. She had a 15% solution on hand, as well as a 30% solution. How many liters of the 15% solution should she add to 3 liters of the 30% solution to get the 20% solution?

	Volume mix (L)	% PP	Volume of PP
start	3	.3	.9
add	X	.15	.15X
finish	3+X	.2	$\frac{.9 + .15X}{.2(3+X)}$

let $x = \#$ of L of 15% add

$$.9 + .15X = .2(3+X)$$

$$90 + 15x = 20(3+x)$$

$$x = 6$$

HOMEWORK:

p. 98-101: 1-15 (all), 28-38 (even)